PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Sequestration

02/2003

NATURAL ANALOGS FOR GEOLOGIC SEQUESTRATION

CONTACT POINTS

Scott M. Klara
Sequestration Product Manager
National Energy Technology Laboratory
626 Cochrans Mill Road
P.O. Box 10940
Pittsburgh, PA 15236
412-386-4864
scott.klara@netl.doe.gov

Michael K. Knaggs
Project Manager
National Energy Technology Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507
304-285-4926
michael.knaggs@netl.doe.gov

Scott Stevens
Advanced Resources International
1110 North Glebe Road
Suite 600
Arlington, VA 22201
703-528-8420

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

Background

Large geologic deposits of high-purity carbon dioxide (CO_2), created entirely by natural geologic processes, occur in many sedimentary basins. They have acted as relatively stable repositories for CO_2 over many thousands of years and prove that geologic sequestration offers a secure, environmentally sound way of storing CO_2. Most importantly, they provide an excellent natural laboratory in which to study the effects of long-term CO_2 exposure on the reservoir minerals. These conditions cannot be replicated by short term laboratory experiments or geologic sequestration tests. CO_2 fields may be viewed as unique “natural analogs” that can be used to assess crucial aspects of geologic sequestration. These assessments would include: integrity of storage, candidate site screening and selection, and operational safety and efficiency. Thus, these CO_2 deposits offer considerable potential for understanding and publicizing geologic sequestration and can serve to build public confidence in this CO_2 management technique.

At present, five large natural CO_2 fields in the United States provide a total of 25 million tons of carbon dioxide that is injected into oil fields for enhanced oil recovery (EOR). This project will perform a multi-disciplinary geologic engineering study of U.S. CO_2 deposits. The overall objective is to compare the naturally occurring CO_2 reservoirs with the capability of depleted oil and gas fields to securely and economically sequester carbon dioxide.

Primary Project Goal

The overall goal is to study natural CO_2 fields to document empirically, both to the scientific community and the public at large, the capability of depleted oil and gas fields to sequester carbon dioxide safely and securely. The effort will also investigate long-term reactions between CO_2 and the various minerals in the reservoir and cap rocks.

Objectives

- Evaluate the safety and security of geologic sequestration
- Adapt specialized CO_2 operations technology to an emerging sequestration industry
- Document analogs for public review

Natural Analogs for Geologic Sequestration

PROJECT PARTNERS

Advanced Resources International

Kinder Morgan CO_2 Company, Ltd.

Ridgeway Petroleum Corporation

British Geological Survey NASCENT Project

Australian Petroleum Cooperative Research Center

TOTAL ESTIMATED COST

Total Project Value:	$1,736,390
DOE Share:	$1,123,390
Non-DOE Share:	$ 613,000

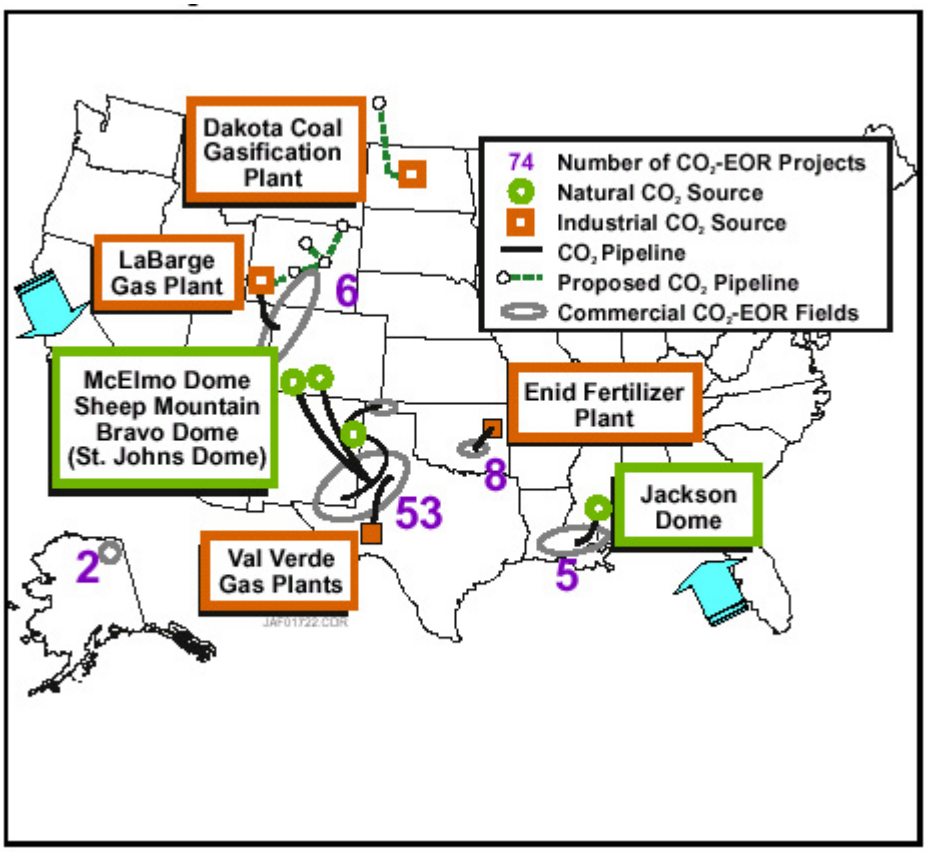
- Evaluation of environmental and safety related factors will be made based on the results of a geochemical analysis of CO_2 impacts and geochemical modeling

Accomplishments

Literature reviews and collection of geologic and reservoir data have been performed. ARI is about one-third of the way towards completing the first comprehensive analysis of three large natural CO_2 fields: Kinder Morgan's McElmo field in Colorado, Ridgeway's St. Johns Dome in Arizona and New Mexico, and Denbury Resources' Jackson Dome field in Mississippi. Existing well log and other geologic information has been collected and is currently being used to build robust geologic models of the three fields.

Benefits

This project will provide information that can be used to develop technologies for safe and secure sequestration of CO_2 in natural geologic formations. Furthermore, the project provides an opportunity to study CO_2 sequestration in a non-intrusive manner at natural sites and to obtain data not otherwise obtainable on the long-term effect of CO_2 on mineral strata.



Location of natural CO_2 study sites in the USA and the CO_2 infrastructure for EOR projects